REMARKS

Claims 6-13 are withdrawn. Claims 1-5 and 14-23 are pending.

Applicant respectfully traverses the rejection of claim 18 under 35 USC 112, second paragraph, as indefinite.

The Examiner first states that it is not clear "what is being set, or how it is being set." Claim 18 depends from claim 1. Claim 1 is clear that the claimed apparatus sets a pretension in a drive that uses a "tension element" (e.g. a steel cable). What is being set is the pretension in a tension element. How this pretension is set is the subject of claim 1 and the entire specification and the drawings. The invention provides "an initiation mechanism" that selectively couples the torque of the output shaft of a drive motor to the tension element. That is he "how," stated most broadly.

The Examiner also questions the meaning of "ultimate desired," "local," and "global" as used in claim 18. These terms are used and explained in the specification at page 2, lines 3-6, page 3, lines 1-8, page 4, lines 18-28, and page 8, lines 3-18 (with reference to Fig. 5). For example, at least from page 2, it is clear that the point of the invention is to set a pretension in the tension element (cables) "to at least one-half of their maximum operating tensions so that neither of an antagonistic pair of cables becomes slack, even when subjected to full operational motor torque." Such a pretensioning is the set or "ultimate desired" pretension value. The invention provides an apparatus to periodically return the actual tension in the tension element to this desired value "so that neither of the antagonistic pair of cables becomes slack."

To create and maintain this level of pretension involves "a highly iterative process because local pretension induced in a short segment of the cable drive does not easily migrate to the rest of the drive ..." (page 3, lines 3-5). "Local" refers to the pretensioning in a "short segment of the cable drive" and "global" refers to "the rest of the drive." These points are repeated at page 4, lines 18-28, with "local" pretension and "global" pretension being used expressly. As expressed in more detail there, "local pretension" is in "the usually short free span of cable between pulley tangents and just a

couple of radians of the wrapped cable nearest the free span." Migration of a local pretension "across the entire cable" produces a "nearly uniform global pretension."

Applicant therefore believes that the terms used in claim 18 are clear and definite, and the Section 112, second paragraph rejection should be withdrawn.

Applicants also respectfully traverse the rejection of claims 1, 3, 4 and 18 under 35 USC 102(b) as anticipated by Applicant's earlier U.S. Patent No. 5,388,480 ("Townsend '480").

Townsend '480 is discussed and distinguished in the present specification, beginning at the bottom of page 2 and continuing to the top of page 5. In particular, the Townsend '480 pretensioner is of the "popular split-pinion" type where the two halves of the motor pinion are counter-rotated to eliminate cable slack and to induce pretension. (See also page 3, lines 19-22 of the present disclosure.)

In the Townsend '480 pretensioner, a cylindrical sleeve 20 carried on one end of a pinion shaft 18 is the counter-rotating element. The Townsend '480 system is not automatic or easily automated. It also must deal with the "capstan effect" whereby the windings of the cable on a capstan (here the split pinion) restricts the transmission of tension if the cable straddles the split to any appreciable degree. Another problem of these known cable pretensioners is that they require skilled and knowledgeable users to apply the pretension, and do so manually.

The present invention, on the other hand, seeks to provide an improved apparatus for pretensioning a tension-element drive powered by a drive motor, whereby the drive motor itself powers the pretensioning. In this regard, the apparatus as claimed in claim 1 includes an initiation mechanism that selectively couples the torque of the output shaft of the motor to pretension the tension element.

In contrast, the motor 14 in '480 D1 has nothing to do with pretensioning. It simply powers whatever end effector that may be driven, e.g. a gripper. To adjust the pretension, Townsend '480 teaches the use of a torque wrench which is inserted into a

hex recess 54 to turn a worm gear 52 mounted in a boss 34 of sleeve 20. The worm 52, in turn, engages and rotates gear teeth 60 formed on a reduced shoulder 32 of the pinion shaft 18. (See col. 3, line 48 to col. 4, line 22 and Fig. 3 of '480 D1). This is a manual pretensioning process. It does not selectively couple the output shaft of the drive motor to pretension the tension element, as claimed. The claimed construction in contrast allows and requires the power of the drive motor to pretension the cable. No wrenches are needed. No worm gear as described in Townsend '480 is needed. No operator performing a manual operation is involved.

Turning to the Section 102(b) analysis on page 3 of the Action, the Examiner equates the claimed "initiation mechanism" to the worm gear 52 alleged to "selectively couple the torque output shaft to the pretension element (20)." However, the worm gear 52, held in a boss 50 of the sleeve 20, is manually rotated via the hex wrench recess 54 to change the relative angular positions of the sleeve (carrying cable 40) and the pinion shaft 18 (carrying cable 28). The worm gear does not "selectively [couple] the torque of the output shaft [pinion 18] to pretension the tension element" (claim 1, lines 2-3).

Regarding claim 3, the Examiner cites col. 3, lines 20-28 of Townsend '480 as teaching a semi-automatic selective coupler. However, this passage teaches one "to rotate with a torque wrench the worm ... ." This is a manual operation, not one that is semi-automatic. Moreover, as noted with respect to claim 1, there is no teaching or suggestion in Townsend '480 that the power of the motor is, or can be, used to pretension the cable.

With respect to claim 4, the Examiner argues that a "mechanical device [worm] (52) selectively blocks any rotating of the sleeve with respect to the shaft. However, as best seen in Townsend '480 Fig. 3, the worm 52 is always engaged with the gear threads 60 on the reduced shoulder 32 at the end of the pinion shaft 18. There is no "selective" engagement a described and claimed in the present application. Nor does the worm 52 operate to couple the output torque of the motor to pretension any cable. In Townsend '480, the physical strength of an operator turning a toque wrench in

hex wrench recess 54 powers a pretensioning. The cited Townsend '480 col. 2, lines 17-19 does not teach the subject matter of claim 4, nor does the cited col. 2, line 44-63.

In sum, Townsend '480 fails to teach or suggest any element that couples the output shaft 18 of the motor 14 in a way that allows the torque produced by the motor to pretension cables 28, 40, let alone one that does so selectively through the action of an initiation mechanism. For at least the above reasons, Applicant respectfully requests the Examiner to reconsider and withdraw the Section 102 rejection.\

Applicant also respectfully traverses the rejection of claim 2 under 35 US 103(a) as obvious over Townsend '480. It may be straightforward in some situations to "replace manual activity by providing a mechanical or automatic means." However, here, the manual pretensioning is a rotation of the worm 52 using a wrench. It is far from clear how one could use the output torque of the motor 14 to actuate the worm 52.

Applicant further respectfully traverses the rejection of claims 5, 14-17 and 19 under 35 USC 103(a) as obvious over Townsend '480 when combined with U.S. Patent No. 6,332,629 to Midorikawa ("Midorikawa").

With respect to the claimed solenoid, the Examiner cites solenoid 112 (Fig.18) that controls a lever 112 of a seat-belt reel locking mechanism. Applicant does not argue that a solenoid actuated locking device is per se new. Claim 5 depends from claim 4 which in turn depends from claim 1. Midorikawa does not supply the deficiencies noted above with respect to Townsend '480 with respect to those claims. Claim 5 is therefore also believed to be clearly allowable.

Midorikawa's controller 200D for motor 110 is cited to reject claims 14 and 15. Again, Midorikawa does not teach or suggest the features of claim 1. There is no reason to use torque control in Townsend '480 because the Townsend '480 motor 14 is not used in pretensioning the tension element; Townsend '480 teaches one to use a wrench.

Similarly, while Midorikawa teaches an encoder and processor, there is no reason to use such devices in Townsend '480 for pretensioning. Claims 16 and 19, each dependent from claim 1, are therefore also believed to be clearly allowable.

Claim 17, dependent from claim 16, provides functional limitations describing in more detail how the apparatus of claim 16 operates to produce the claimed pretensioning. In particular, claim 17 defines the apparatus of the invention in more detail, not merely an intended use.

Applicants also respectfully traverse the rejection of claim 20 under 35 USC 103(a) as obvious over Townsend '480 in view of Midorikawa and further in view of U.S. Patent No. 3,324,719 to Segrave ("Segrave") cited as disclosing a strain gauge to measure strain on a cable. Segrave discloses a strain gauge, but it does not supply the deficiencies noted above with respect to Townsend '480 and Midorikawa.

Applicants also respectfully traverse the rejection of claims 21-23 under 35 USC 103(a) as obvious over Townsend '480 when combined with U.S. Patent No. 5,745,382 to Vilim et al. ("Vilim"), cited as teaching a processor that runs neural network algorithms. Vilim does not supply the deficiencies noted above with respect to Townsend '480. There is no reason, without the hindsight benefit of the present invention, why one would find any relevance for a processor, let alone a processor running neural network algorithms, in combination with the Townsend '480 manual tensioner structure. Claims 21-23 are also clearly patentable over the art of record.

Applicant is submitting herewith a Petition for a three (3) month extension of time, to and including September 2, 2010, together with the appropriate fee for a small entity.

In view of the foregoing remarks, Applicant urges that the pending claims define clear cut patentable differences over the art of record, and that this application is otherwise in condition for allowance.

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Respectfully submitted,

By _____

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